REMARKS

The Final Office Action of November 12, 2009 has been reviewed and the comments therein carefully considered. Claim 4 is herein amended to define the peroxide compound as benzoyl peroxide. Support for this amendment can be found, for example, in claim 9. No new matter has been added. Claims 9 and 26-29 have been canceled. Thus, upon entry of this amendment, claims 4-5, 7-9, 21, 23 and 25 would remain pending. Entry of this amendment is respectfully requested as it is believed to place the application in condition for allowance.

Claims 4-5, 7-9, 21, 23, 25-26 and 28-29 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 6,472,082 to Kodemura. This rejection is respectfully traversed.

Applicants' invention is directed to a method of producing a modified cycloolefin copolymer through addition of a modifier compound having a functional group and a hydrogen-donating group or an alkyl halide group. While modified cycloolefins and methods of producing them are known (*see* "Background" section), uniform modification of a cycloolefin copolymer has proved to be difficult based, at least in part, on the steric hindrance attributable to the structural skeleton of cycloolefin chain parts of the main chain. Applicants have developed an inventive method of producing modified cycloolefin copolymers wherein the modifier compound can be incorporated at a higher level and with greater uniformity. According to the claimed process, the main-chain cycloolefin chains can be converted into radicals without ring opening of the cycloolefin chains so as to develop an "electron accepting/electron donating" relationship. By avoiding cycloolefin ring opening, functional groups can be added uniformly to the cycloolefin copolymer without producing the heterogeneous structures commonly attributable to the ring-opening reactions. The above-described effects are achieved in the claimed method by carefully controlling the conditions of the reaction as well as the identity, amounts, and ratios of the reactants. Kodemura fails to teach, suggest, or render obvious a method meeting all of the limitations recited in the claims, and therefore the pending claims are patentable over Kodemura.

For instance, in the process defined in claim 4, the peroxide compound (benzoyl peroxide) is added to the solution containing the modifier compound, organic solvent, and base cycloolefin copolymer while the solution is heated to between 70 and 95°C. While Kodemura discusses a broad temperature range of from 0 to 400°C and preferably between 60 and 350°C for reacting the peroxide compound with the base polymer (Kodemura, col. 15, lines 49-51), in the Examples and Comparative Examples of Kodemura each sample is prepared by reacting the peroxide at a temperature of 150°C, which is well above the temperature recited in the claim. At this higher temperature, the decomposition rate of the peroxide is promoted to such a high level that the likelihood of poor hydrogen-abstracting is greatly increased. Applicants submit that the broadly sweeping temperature range disclosed in Kodemura's specification, considered in combination with the consistent and repeated use of a temperature of 150°C in the Examples section, would not teach or suggest to one skilled in the art a temperature range of 70-95°C for carrying out the peroxide reaction, as is defined in the claims.

In addition, in the claimed method the peroxide compound is added in an amount such that the ratio (in terms of the number of moles of radicals) of the peroxide compound to a polymerizable unsaturated group in the modifier compound is between 0.7/1 and 2.5/1. The recent Office Action cites to Comparative Examples 3, 28 and 29 as allegedly disclosing a method having a peroxide to modifier ratio falling within this range. A detailed calculation of the ratio for Comparative Examples 3, 28 and 29 of Kodemura follow. Applicants previously provided a calculation of the peroxide to modifier ratio of Example 3 of Kodemura, though (as was pointed out in the Office Action) this calculation appeared to be incorrect. A corrected calculation based on Example 3 of Kodemura is also provided.

<u>Comparative Example 3 of Kodemura:</u>

- Polymer: 50 parts by weight
- Peroxide: dicumyl peroxide (mw=270; decomposes to generate two radicals);
- Modifier: maleic anhydride (mw=98.1);

- The peroxide and modifier are both added in an amount of 3 parts by weight.
- Ratio = (2x3/270) / (3/98.1) = 0.73.

Comparative Example 28 of Kodemura:

- Polymer: 50 parts by weight
- Peroxide: dicumyl peroxide (mw=270; decomposes to generate two radicals);
- Modifier: allyl glycidyl ether (mw=114.2);
- The peroxide is added in an amount of 3 parts by weight, and the modifier is added in an amount of 10 parts by weight.
- Ratio = (2x3/270) / (10/114.2) = 0.25.

Comparative Example 29 of Kodemura:

- Polymer: 50 parts by weight
- Peroxide: dicumyl peroxide (mw=270; decomposes to generate two radicals);
- Modifier: maleic anhydride (mw=98.1);
- The peroxide is added in an amount of 3 parts by weight, and the modifier is added in an amount of 10 parts by weight.
- Ratio = (2x3/270) / (10/98.1) = 0.22.

Example 3 of Kodemura (corrected calculation):

- Polymer: 50 parts by weight
- Peroxide: dicumyl peroxide (mw=270; decomposes to generate two radicals);
- Modifier: maleic anhydride (mw=98.1);
- The peroxide is added in an amount of 3 parts by weight and the modifier is added in an amount of 30 parts by weight.
- Ratio = (2x3/270) / (30/98.1) = 0.07.

From the above, it is apparent that only Comparative Example 3 falls even remotely near the claimed range. However, the peroxide compound used in Comparative Example 3 is dicumyl peroxide, not benzoyl peroxide. Moreover, the

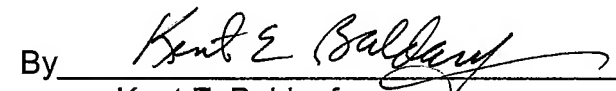
temperature at which the reaction of the dicumyl peroxide, polymer, and maleic anhydride is carried out is 150°C. On the other hand, the method of claim 4 uses benzoyl peroxide and the temperature range of the peroxide-based reaction is between 70 and 95°C, well below the 150°C temperature utilized in Kodemura. The ratios in Comparative Examples 28 and 29 and Example 3 demonstrate that Kodemura did not contemplate a peroxide to modifier ratio range similar to the range in claim 4. Overall, the reaction process suggested by Kodemura is not believed to render obvious the unique combination of reaction limitations defined in claim 4.

Accordingly, the present invention is not an obvious variation of the method of Kodemura. Rather, the present invention provides a novel method of producing modified cycloolefin copolymers which focuses on a hereunto unknown combination of reaction conditions and reactants in order to produce a more uniformly modified cycloolefin copolymer.

For the foregoing reasons, Applicants submit that the pending claims are patentable over the cited art of record and are in condition for allowance. Accordingly, entry of the present amendment, reconsideration of the outstanding rejection, and allowance of pending claims 4-5, 7-9, 21, 23 and 25 are respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

By 

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